

Appl. No. 10/552,540
Amdt. Dated August 30, 2007
Reply to Office Action of May 3, 2007

Attorney Docket No. 81844.0044
Customer No.: 26021

REMARKS

This application has been carefully reviewed in light of the Office Action dated May 3, 2007. Claims 1-5 and 7-42 remain in this application. Claims 1, 7-10 and 23 are the independent Claims. Claims 1, 7-9 and 23 have been amended. Claim 6 is canceled, without prejudice. New Claims 24-42 are added. It is believed that no new matter is involved in the amendments or arguments presented herein. Reconsideration and entrance of the amendment in the application are respectfully requested.

Allowable Subject Matter

On page 3 of the Office Action, Claims 10-20 were indicated as allowable over the prior art. Claim 8 was indicated to be allowable if re-written in independent form and to include all of the limitations of the base claim and any intervening claims.

Applicant thanks the Examiner and formally recognizes the allowed Claims 10-20.

Art-Based Rejections

Claims 1-7, 9 and 21-23 were rejected under 35 U.S.C. § 102(b) over Japanese Patent Publication No. 06-264035 (Shinji); Claims 1-9 and 21-23 were rejected under 35 U.S.C. § 103(a) over Shinji.

Applicant respectfully traverses the rejections and submits that the claims herein are patentable in light of the clarifying amendments above and the arguments below.

New Claims

New claims 24-42 are added to better define applicant's invention and find support in original claims 2-20. New claims 24-42 are dependent on base claim 23.

The Shinji Reference

Shinji is directed to an adhesive film, its production and a method for adhesion. Shinji discloses a polyimide resin 1, epoxy resin (B) and phenol resin (C) having various compositions (*See Shinji; Abstract, Claim 1, Paragraphs [0005]-[0007] and Table 1*).

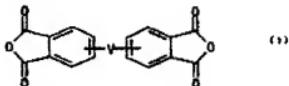
The Claims are Patentable Over the Cited References

The present application is generally directed to a thermosetting resin composition.

Claim 1

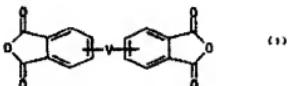
As defined by amended independent Claim 1, a thermosetting resin composition includes at least a polyimide resin component (A) containing at least one polyimide resin. A phenol resin component (B) contains at least one phenol resin. An epoxy resin (C) component contains at least one epoxy resin. The mixing ratio by weight (A)/[(B)+(C)] is in a range of 0.4 to 2.0, the mixing ratio by weight being the ratio of the weight of the polyimide resin component (A) to the total weight of the phenol resin component (B) and the epoxy resin component (C). The polyimide resin (A) is produced by reacting an acid dianhydride component with a diamine component or an isocyanate component, and the acid dianhydride

component contains at least an acid dianhydride represented by general formula (1):



V represents a direct bond, --O--, --O-T-O--, --(C=O)--, --C(CF₃)₂--, or --C(CH₃)₂--. T represents a divalent organic group.

The applied references do not disclose or suggest the features of the present invention as defined by amended independent Claim 1. In particular, the applied references do not disclose or suggest, "the polyimide resin (A) is produced by reacting an acid dianhydride component with a diamine component or an isocyanate component, and the acid dianhydride component contains at least an acid dianhydride represented by general formula (1):



wherein V represents a direct bond, --O--, --O-T-O--, --(C=O)--, --C(CF₃)₂--, or --C(CH₃)₂--, T representing a divalent organic group," as required by amended independent Claim 1.

Shinji discloses a polyimide resin 1, epoxy resin (B) and phenol resin (C) having various compositions (*See Shinji; Claim 1 and Paragraphs [0005]-[0007]*). In contrast, amended independent claim 1 is amended to avoid overlapping with the disclosed compositions of Shinji. The present invention provides excellent

properties, such as flowability to the composition and dielectric characteristics to the cured resin that Shinji does not disclose or suggest.

Thus, Shinji does not disclose or suggest this feature of the present invention as required by amended independent Claim 1.

Since the applied references fail to disclose, teach or suggest the above features recited in amended independent Claim 1, those references cannot be said to anticipate nor render obvious the invention which is the subject matter of that claim.

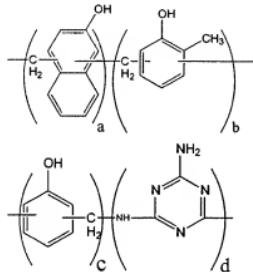
Accordingly, amended independent Claim 1 is believed to be in condition for allowance and such allowance is respectfully requested.

Applicant respectfully submits that amended independent Claim 7 includes the above features and are allowable for at least the same reasons as discussed above with reference to amended independent Claim 1 and such allowance is respectfully requested.

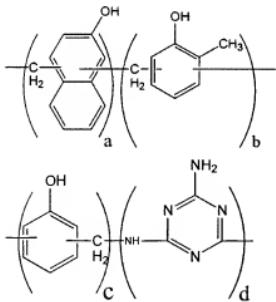
Claim 8

As defined by amended independent Claim 8, a thermosetting resin composition includes at least a polyimide resin component (A) containing at least one polyimide resin. A phenol resin component (B) contains at least one phenol resin. An epoxy resin (C) component contains at least one epoxy resin. The mixing ratio by weight (A)/[(B)+(C)] is in a range of 0.4 to 2.0, the mixing ratio by weight being the ratio of the weight of the polyimide resin component (A) to the total weight of the phenol resin component (B) and the epoxy resin component (C). The phenol resin component (B) contains at least one phenol resin selected from the

group consisting of compounds having structures represented by the formulae with a, b, c and d each representing an integer of 1 to 10.



The applied references do not disclose or suggest the features of the present invention as defined by amended independent Claim 8. In particular, the applied references do not disclose or suggest, "the phenol resin component (B) contains at least one phenol resin selected from the group consisting of compounds having structures represented by the formulae:



wherein a, b, c, and d, each represent an integer of 1 to 10," as required by amended independent Claim 8.

Shinji discloses a polyimide resin 1, epoxy resin (B) and phenol resin (C) having various compositions (*See Shinji; Claim 1 and Paragraphs [0005]-[0007]*). In contrast, amended independent claim 8 is amended to avoid overlapping with the disclosed compositions of Shinji. The present invention provides excellent properties, such as flowability to the composition and dielectric characteristics to the cured resin that Shinji does not disclose or suggest.

Thus, Shinji does not disclose or suggest this feature of the present invention as required by amended independent Claim 8.

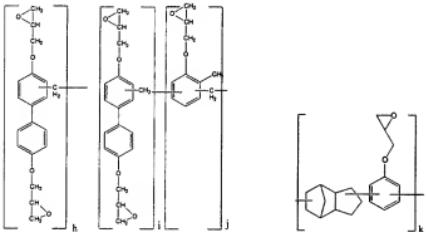
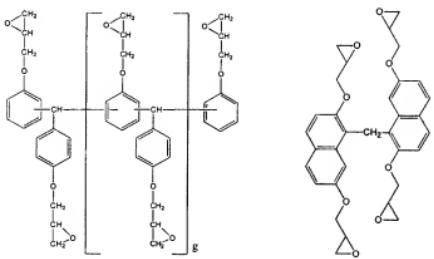
Since the applied references fail to disclose, teach or suggest the above features recited in amended independent Claim 8, those references cannot be said to anticipate nor render obvious the invention which is the subject matter of that claim.

Accordingly, amended independent Claim 8 is believed to be in condition for allowance and such allowance is respectfully requested.

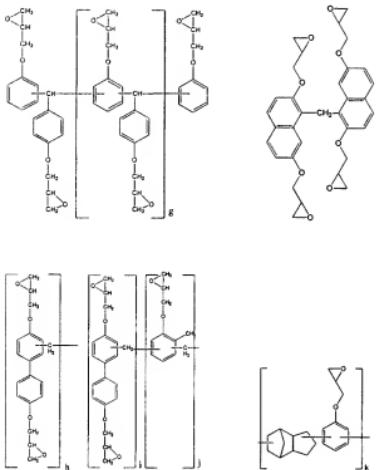
Claim 9

As defined by amended independent Claim 9, a thermosetting resin composition includes at least a polyimide resin component (A) containing at least one polyimide resin. A phenol resin component (B) contains at least one phenol resin. An epoxy resin (C) component contains at least one epoxy resin. The mixing ratio by weight (A)/[(B)+(C)] is in a range of 0.4 to 2.0, the mixing ratio by weight being the ratio of the weight of the polyimide resin component (A) to the total weight of the phenol resin component (B) and the epoxy resin component (C). The epoxy resin component (C) contains at least one epoxy resin selected from the group

consisting of compounds having structures represented by the formulae wherein g, h, i, j, and k each represent an integer of 1 to 10:



The applied references do not disclose or suggest the features of the present invention as defined by amended independent Claim 9. In particular, the applied references do not disclose or suggest, "wherein the epoxy resin component (C) contains at least one epoxy resin selected from the group consisting of compounds having structures represented by the formulae:



wherein g, h, i, j, and k each represent an integer of 1 to 10," as required by amended independent Claim 9.

Shinji discloses a polyimide resin 1, epoxy resin (B) and phenol resin (C) having various compositions (*See Shinji; Claim 1 and Paragraphs [0005]-[0007]*). In contrast, amended independent claim 9 is amended to avoid overlapping with the disclosed compositions of Shinji. The present invention provides excellent properties, such as flowability to the composition and dielectric characteristics to the cured resin that Shinji does not disclose or suggest.

Thus, Shinji does not disclose or suggest this feature of the present invention as required by amended independent Claim 9.

Since the applied references fail to disclose, teach or suggest the above features recited in amended independent Claim 9, those references cannot be said to

anticipate nor render obvious the invention which is the subject matter of that claim.

Accordingly, amended independent Claim 9 is believed to be in condition for allowance and such allowance is respectfully requested.

Claim 23

As defined by amended independent Claim 23, a circuit board includes a layer having a dielectric constant of 3.3 or less and a dielectric loss tangent of 0.020 or less in a range of in a frequency range of 1 to 10 GHz and being formed on wiring boards or circuits. The layer is obtained by curing a thermosetting resin composition including at least a polyimide resin component (A) containing at least one polyimide resin, a phenol resin component (B) containing at least one phenol resin, and an epoxy resin component (C) containing at least one epoxy resin. The mixing ratio by weight (A)/[(B)+(C)] is in a range of 0.4 to 2.0, the mixing ratio by weight being the ratio of the weight of the polyimide resin component (A) to the total weight of the phenol resin component (B) and the epoxy resin component (C).

The applied references do not disclose or suggest the features of the present invention as defined by amended independent Claim 23. In particular, the applied references do not disclose or suggest, "a layer having a dielectric constant of 3.3 or less and a dielectric loss tangent of 0.020 or less in a range of in a frequency range of 1 to 10 GHz," as required by amended independent Claim 23.

Shinji does not disclose the dielectric characteristics of cured product obtained from Applicant's composition, because the composition disclosed in Shinji is used in die bonding, which does not require the low dielectric constant or the low

dielectric loss tangent of the present invention. In fact, the composition disclosed in Shinji requires an inorganic filler. The cured product obtained from the composition in example 1 and 5 includes significant amounts of silica or alumina and consequently does not exhibit a low dielectric constant. Applicant respectfully submits that one of ordinary skill in the art would not expect that the addition of a significant amount of silica or alumina would produce a cured product having a low dielectric constant. Furthermore, one of ordinary skill would not think to use phenol resin and epoxy resin, since these resins produce a high dielectric constant in the cured product.

The present invention, by contrast, requires a layer having a dielectric constant of 3.3 or less and a dielectric loss tangent of 0.020 or less in a range of in a frequency range of 1 to 10 GHz. Shinji does not disclose or suggest these features of the present invention, and in fact teaches against these features such that they are not obvious in view of Shinji.

Provided below is Table 1 of Shinji, with the addition of another row showing the calculated mixing ratio of Polyimide/(Phenol Resin + Epoxy Resin) based on the examples of Shinji.

Table 1:

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Polyimide	A 100	B 100	C 100	A 100	A 100	-	A 100
Epoxy Resin	YDCH-702 50	N-865 20	ESCN-19 5 10	N-865 10	N-865 100	YDCH-702 100	-
Phenol	H-1 24	H-1 10	VH-	VH-41	VH-	H-1	-

Resin			4170 5.6	70 5.6	4170 70	48	
Hardening Accelerator	2P4MHZ 0.5	TPPK 0.4	2MA-OK 0.1	TPPK 0.5	TPPK 10	SP4MHZ 1	-
Inorganic Filler	Silica 80	Silica 45	Silica 18	Alumina 100	Alumina 190	Silica 180	Silica 180
Calculated Mixing Ratio of PI(PH+EP)	1.35	3.33	6.29	6.41	0.59	-	-

Note: The dielectric constant of silica is about 3.8 and the dielectric constant of alumina is about 8.5 in the MHz range. The one in the GHz range is expected to be a higher number.

Thus, Shinji does not disclose or suggest this feature of the present invention as required by amended independent Claim 23.

Since the applied references fail to disclose, teach or suggest the above features recited in amended independent Claim 23, those references cannot be said to anticipate nor render obvious the invention which is the subject matter of that claim.

Accordingly, amended independent Claim 23 is believed to be in condition for allowance and such allowance is respectfully requested.

The remaining claims depend either directly or indirectly from independent claim 10 and amended independent Claims 1, 7-9, and 23 and recite additional features of the invention which are neither disclosed nor fairly suggested by the applied references and are therefore also believed to be in condition for allowance.

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Conclusion

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 785-4721 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

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